Cisco LocalDirector

This chapter provides information on the Cisco LocalDirector product. The information is organized into the following sections:

- Product Overview
- Standard Features
- Product Numbers

Product Overview

Cisco Systems' LocalDirector meets the demands of high-volume TCP/IP traffic by allowing multiple servers—even a collection of heterogeneous hardware and operating systems—to appear as a single IP address. LocalDirector's Session Distribution Algorithm (SDA) allocates connections to the currently highest-performing server in the network. The resulting redundancy and performance assure unprecedented levels of user service.

LocalDirector also allows World Wide Web (WWW) service providers to transparently support multiple domain addresses from a single server, freeing up resources and improving network flexibility. Combine this functionality with the SDA session distribution capability to scale your system seamlessly while taking full advantage of intelligent load balancing.

LocalDirector is fast—over 45 Mbps throughput. Simple setup with no network address changes frees up valuable system administration time. LocalDirector meets the major challenges in extending local Internet services in a manageable and scalable manner.

Figure 141 Cisco LocalDirector Front View

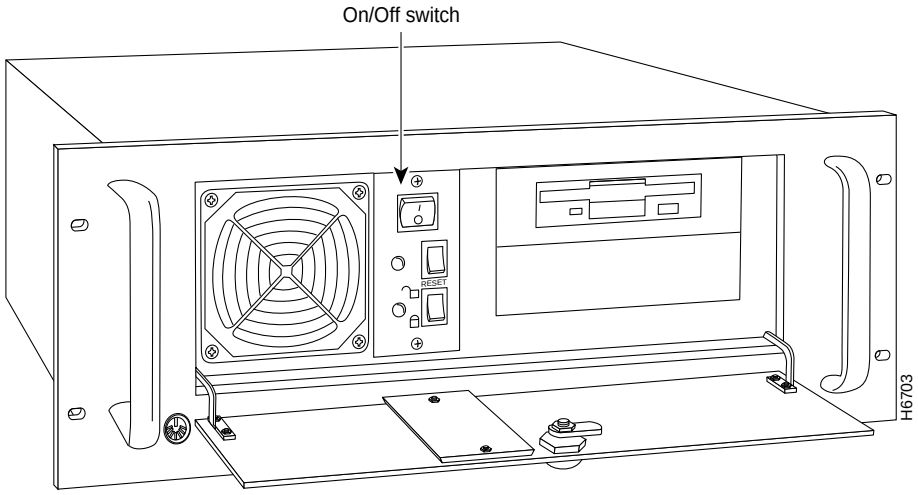
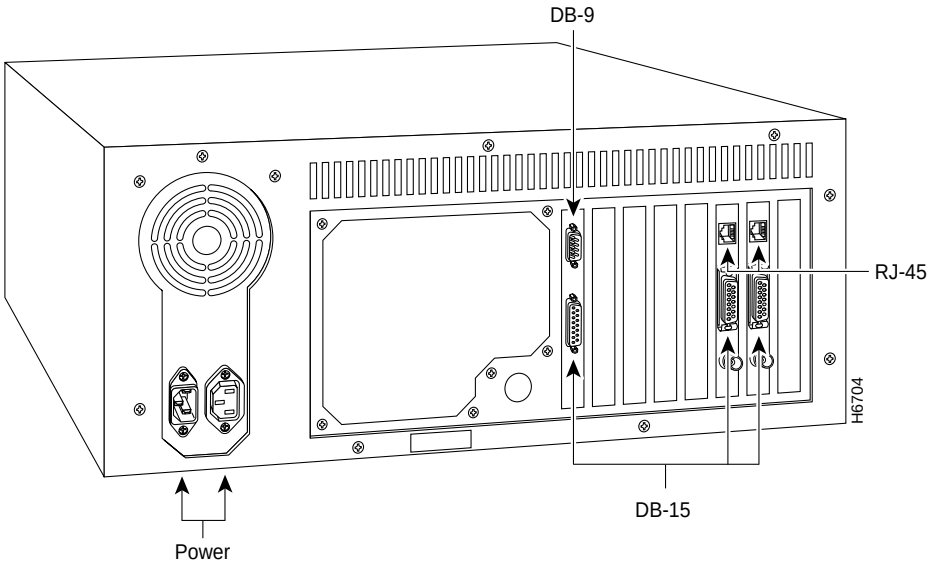


Figure 142 Cisco LocalDirector Rear View



Standard Features

Cisco LocalDirector includes the following features:

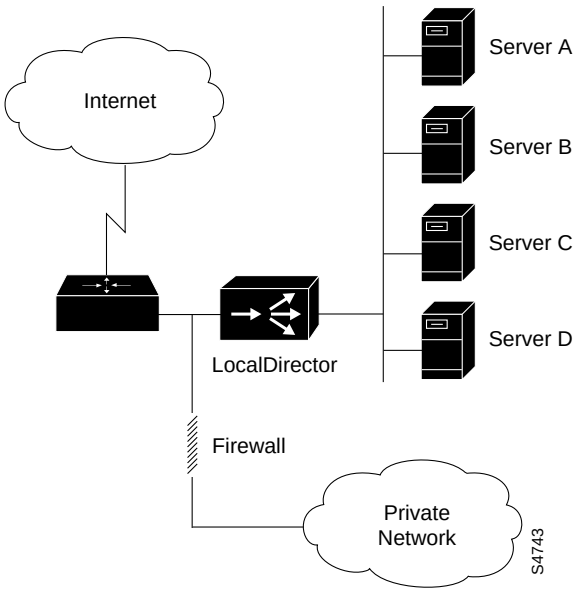
- Transparent support for all common TPC/IP Internet services, such as World Wide Web, FTP, Telnet, Gopher, and Rlogin
- Secure real-time kernel
- Normal configuration in approximately ten commands
- Supports more than 1,000,000 simultaneous TCP sessions

- Provides over 45 Mbps throughput
- Configurable with over 1024 virtual addresses and over 1024 physical addresses
- Supports 10BaseT and 100BaseTX Ethernet ports selectable for either 10 Mbps or 100 Mbps
- Not a proxy server—does not require specialized client or host software
- Logs errors and other events via syslog

TCP Across Multiple Servers: Inverse Multiplexing Mode

Cisco solves the TCP-across-multiple-servers problem by using LocalDirector's inverse multiplexing mode (IMM) to present the appearance of a single server to the outside, while actually using the power of multiple servers (see Figure 143).

Figure 143 Inverse Multiplexing Mode Example



LocalDirector supports multiple IMM groups. Each IMM group consists of a virtual address multiplexed to many real servers each with a real IP address. LocalDirector measures the load on the servers specified in the IMM groups and intelligently distributes the load among those servers. In this way, LocalDirector provides nearly linear scalability.

LocalDirector is a transparent device—servers behind LocalDirector are accessible using their real IP addresses. Only the connections made to the virtual addresses (using IMM) are distributed. It is this virtual address that is assigned to the Domain Naming System (DNS). This is important because many client software applications cache the DNS entry for extended periods.

LocalDirector measures how well the server is providing service to the clients and uses this information to distribute connections to the server that are best able to serve the client using the session distribution algorithm (SDA).

In the SDA example shown in Table 315, four servers with different performance capabilities are located behind LocalDirector in a configuration similar to the one shown in Figure 143.

Table 315 Session Distribution Algorithm Example

Server	IP Address	Performance Index (at idle)	Server Type
A	192.1.1.1	10	Intel P5—IDE disk
B	192.1.1.2	20	Intel P6—SCSI disk
C	192.1.1.3	30	SGI—SCSI disk
D	192.1.1.4	30	SGI—SCSI disk

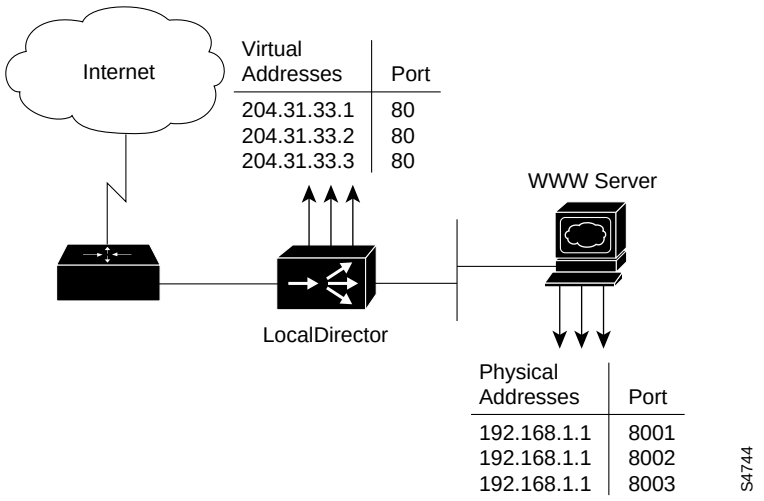
Servers C and D have similar response times as measured by the SDA. Connection requests are fed primarily to servers C and D (the highest-performance servers) sequentially until their performance indexes degrade to less than 20. At this point, the SDA assigns more connections to server B. With increased load, the performance index for B degrades along with that for C and D. The SDA continuously monitors response times, network utilization, and application mix to ensure that connections are allocated to the highest-performance server. When the performance indexes of servers B, C, and D fall below 10, server A begins to take connections.

When a server fails, the SDA notices the long response time and re-routes pending connections to healthy servers. The SDA checks the failed server periodically, and when the server returns, begins to issue connections again.

Serving Multiple Domains from One Server: Forward Multiplexing Mode

LocalDirector solves the multiple-domains-from-one-server problem by enabling forward multiplexing mode (FMM). Under FMM, LocalDirector allocates multiple virtual addresses mapped to a single server using multiple TCP ports. Figure 144 illustrates this capability.

Figure 144 Forward Multiplexing Mode Example



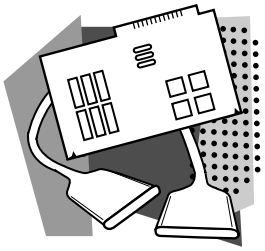
In this example, a single server (192.168.1.1) runs multiple Web server processes, each residing on a different TCP port. The outside world, however, sees the virtual addresses for three separate servers.

LocalDirector allows administrators to scale this configuration by specifying multiple sets of IMM groups. Additionally, administrators can specify the physical addresses in groups to take advantage of load balancing, as described for IMM.

Additional Benefits

Cisco LocalDirector includes the following additional benefits:

- LocalDirector's session distribution algorithm can be applied to any TCP service, not just a WWW service.
- Because the LocalDirector product appears to the network as a data link switch, administrators can install LocalDirector with no network address changes
- LocalDirector is not a proxy server and does not require specialized client or host software
- LocalDirector provides TCP fault tolerance to Internet and Intranet services



Product Numbers

Table 316 lists the product numbers for Cisco LocalDirector.

Table 316 Cisco LocalDirector Product Numbers

Description	Product Number
Cisco LocalDirector	CA-LDIR
2 10/100 Ethernet interfaces	NI-2FE
2 10/100 Ethernet interfaces	NI-2FE=
Standard cord options	CAB-AC CAB-ACE CAB-ACI CAB-ACU CAB-ACA
Cisco LocalDirector software	SW-LDIR
Cisco LocalDirector software version update	SW-LDIR-VER=
Cisco LocalDirector SMARTnet maintenance	CON-SNT-LDIR